

Hand Gesture Control Robot

Shakir AlGhamdi

Department of Electrical and Electronics Engineering Technology
Yanbu Industrial College
Yanbu Al-Sinaiyah, KSA
alghamdis@rcyci.edu.sa

Ronilo Santos

Department of Electrical and Electronics Engineering Technology
Yanbu Industrial College
Yanbu Al-Sinaiyah, KSA
santosr@rcyci.edu.sa

Rayan Meteb Nuwayfe AlHarbi

Department of Electrical and Electronics Engineering Technology
Yanbu Industrial College
Yanbu Al-Sinaiyah, KSA
3713012@stu.rcyci.edu.sa

Ahmed Mohammed Salman Albalawi

Department of Electrical and Electronics Engineering Technology
Yanbu Industrial College
Yanbu Al-Sinaiyah, KSA
3713019@stu.rcyci.edu.sa

Abstract

Nowadays most of the robots are controlled in many ways like using sensors, using voice commands and mobile phones. All of those things increased the complexity of the system in terms of its software and hardware parts.

The idea of the project was to develop a hand gesture robot that is simple and low cost in nature and intended to assist and can serve individuals with special needs or disability. The robot can move by using our hand to control its direction to move to the left, right as well as forward and reverse direction. In this way, we can use it for serving purposes in our homes, in restaurants and other facility that the robot can be utilize and serves its main purpose.

Keywords

Robot
Arduino
Transmitter
Receiver
Bluetooth
Hand Gesture

1. Background

These types of projects will be very helpful in our vision 2030 because in the future many robots will be active in the market. In the future we will use robots in every operation to make our life more comfortable and easy. The robot can be used in many places to give services and make it faster with less cost. In many countries, the robot has become part of human life.

Our decision to make a Hand Gesture Smart Robot will be able to facilitate and accelerate many things in society. It can be used in hospitals, shops and restaurants. Many people will benefit from this project, the idea, the fun and usefulness.

2. Objectives

For the purpose of making our life more comfortable many projects are developed and being in the market so we decide to make something that can be useful and new to help achieve the goal .

3. Methodology

In this project, accelerometer reads the X Y Z coordinates when we make gestures by hand and send the X Y Z coordinates to the Arduino (here we don't need the Z axis we need only two coordinate, X and Y) The Arduino checks the values of coordinates and sends a 4 bit code to the Encoder IC. The Encoder passes the data to RF transmitter and the transmitted data is received by the RF receiver. The receiver sends the 4 bit code to the Decoder IC and the decoder passes it goes to Motor Driver IC. Later the motor driver makes the decision to turn the two motors in the required direction.

4. Results and Analysis

A lot of prototypes and tests were made to determine the final design of the project. Prototypes were made to make each output component to function individually before combining them for the final product. Tests were made to determine the best sensitivity setting for the ADXL335 accelerometer sensor by measuring the output of sensor pins comparing with the movements of the robot. After doing tests, the group was able to configure the device and calibrate it to be ready for any user. Determining the output of the sensor pins after we connect all the circuit with the normal values will determine the best configuration for the user. The device is now ready for use and can detect X Y coordinates when we make gestures by hand with accurate sensitivity.

5. Conclusion

For the purpose of making our life more comfortable many projects are developed and being in the market so Hand Gesture Smart Robot is the device that can help and serve. People sometimes suffer from various diseases or conditions that may hinder them from performing work. The robot never becomes ill or need rest. Also the robot will take the request without awful response. The main function of Hand Gesture Smart Robot is to deliver in less time and effort. It can be used in hospitals and restaurants in its current form and if developed more may be used in industries and companies and this will increase productivity for users.

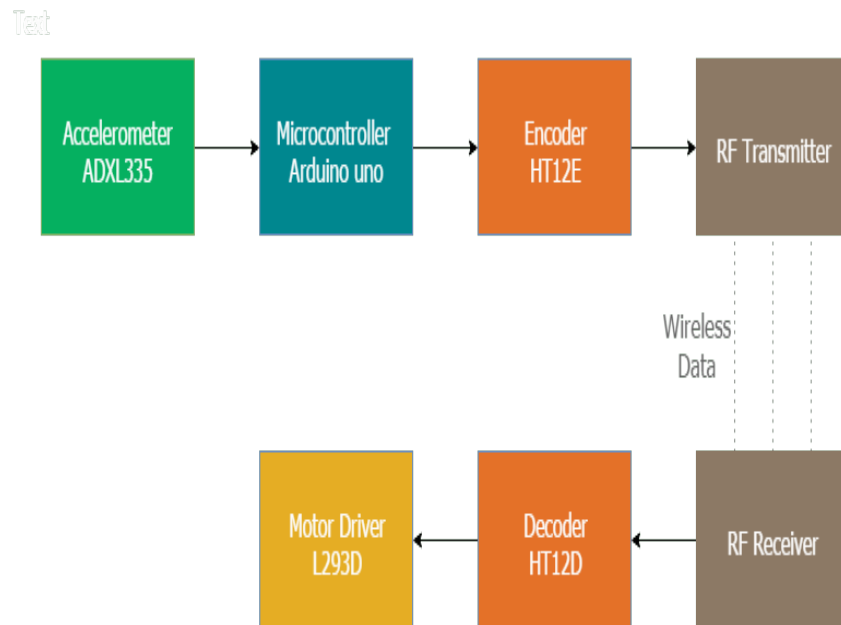


Figure1. Hand Gesture Control Robot Block Diagram

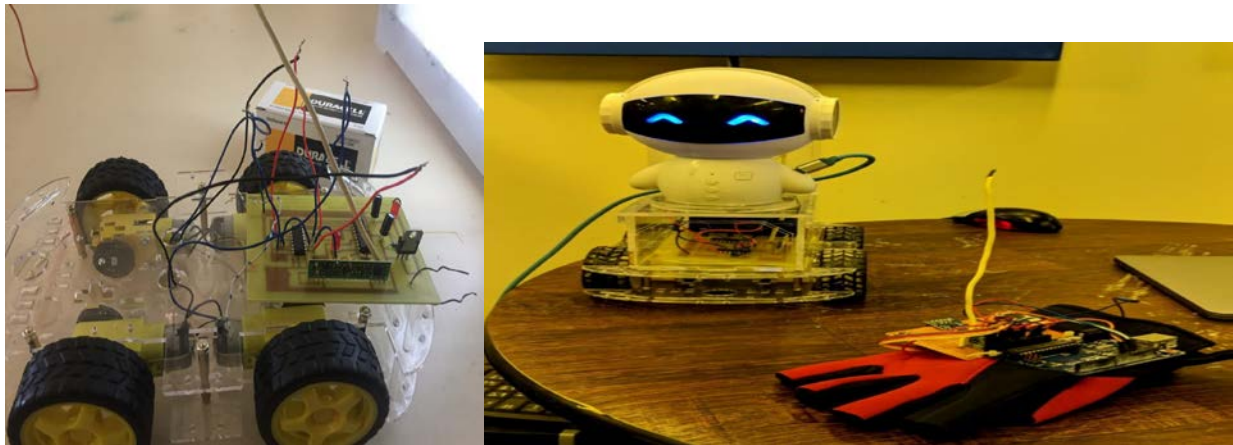


Figure2. Hand Gesture Control Robot

Acknowledgements

In the Name of Allah, we express gratitude toward Allah for helping us in finishing our courses. We began the second semester in our Senior Design Project in this semester to complete the other half of this project. We might want to offer our most huge gratefulness to HOD, EEET, Dr. Raed Al-Thomali and each one of our Specialists and Instructors. We also want to offer significant thanks to the Centralized Committee for Coop and Summer Training Department Preparing Division and all the staff that offer us a very good chance to learn and enhance our abilities and helping us amid this semester. We see the

particular appeal to our Boss Engr. Ronilo Santos who guided us amidst throughout our work. Slightest, however not last we had an outstanding experience amid our venture, cooperation and helped each other and figured out how to function as one group toward our objective .At last, we thank everyone for their efforts in this project and we learned many important experience like for example how to work together as a team and how to divide the work between us and finish in time, also we thank our family and friends for their great support during our study in this college.

References

<https://store.arduino.cc/usa/arduino-uno-rev3>

<http://www.e-jpc.com/pdf/dcmotors601-0241.pdf>

<https://www.sparkfun.com/datasheets/Components/SMD/adx1335.pdf>

https://www.mouser.com/catalog/specsheets/Seeed_113060000.pdf

<https://create.arduino.cc/projecthub/user206876468>

www.alldatasheet.com

https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Electronics

Biographies

Shakir AlGhamdi is a Lecturer, and Program Coordinator of Electronics and communications Engineering Program in Department of Electrical and Electronics Engineering Technology at Yanbu Industrial College, Yanbu Al-Sinaiyah, KSA. He earned BSc. in Electrical Engineering from South Dakota School of Mines & Technology (USA) and MSc in Electrical Engineering from South Dakota School of Mines & Technology (USA) in 2006. His research interests are in microcontrollers, wireless communication and robotics.

Rayan Meteb Nuwayfe AlHarbi is a Bachelor of Science in Electronics Engineering Technology graduating student in the Department of Electrical and Electronics Engineering Technology Department at the Yanbu Industrial College, Yanbu Al-Sinaiyah, KSA. He will earn his B.S. in Electronics Engineering Technology from Yanbu Industrial College this year. His research interest is in microcontrollers, wireless communication and robotics.

Ahmed Mohammed Salman Albalawi is a Bachelor of Science in Electronics Engineering Technology graduating student in the Department of Electrical and Electronics Engineering Technology Department at the Yanbu Industrial College, Yanbu Al-Sinaiyah, KSA. He will earn his B.S. in Electronics Engineering Technology from Yanbu Industrial College this year. His research interest is in microcontrollers, wireless communication and robotics.